Research Center: Dynamics of High Latitude Marine Ecosystems (IDEAL)

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Project Description
The IDEAL Centre is structered around five research programs: RP1) Marine Productivity in a changing ocean; RP2) Physiological capabilities of marine species: A comparative eco-physiological and genetics approach; RP3) Comparative structure and function of plankton; RP4) Comparative structure and function of benthos; and RP5) Coastal and marine socio-ecological systems, ecosystem services, and human well-being. These programs will work on an interdisciplinary framework to address the following topics: (1) Connectivity between Antarctic Peninsula and Chilean Southern Patagonia; (2) Modulation of the biological interactions triggered by environmental stress in Antarctic and sub-Antarctic systems; (3) Global Change impacts at different levels from species (ecophysiology of key species from the benthos and plankton) up to marine communities (dynamics). These three topics will interact to explore global change effects on marine ecosystems include various stressors, largely temperature, salinity (freshening), acidification and hypoxia; how the organisms react to these stressors and how their interactions would modulate the structure and function of these ecosystems are key questions. Whether species from narrow thermal variation would be more vulnerable to future global warming or whether the rapid regional warming of the AP during the last decades may enable new taxa to establish populations in Antarctica, needs to be addressed. Finally, (4) Human dimension of the socio-ecological marine and coastal systems. This addresses issues such as the links between the costal ecosystem, ecosystem services they provide (i. e. fisheries, aquaculture, biofuels, climate regulation, nutrient cycling, recreation opportunities, tourism, research and education, esthetic benefits, spiritual and cultural services), and the vulnerability and human well-being of local and distant populations.
All research programs are interconnected through a modeling and synthesis effort (centered in RP3 and RP4 with feedback from all RP's), in charge of summarizing and performing analysis of large volumes of information at different levels, from individuals (i. e. growth, mortality) to community (i. e. predation, resource competition) and ecosystem (e. g. carbon flux).

The IDEAL Centre will contribute to the SOOS's objectives 4) and 5) by providing a new set of observations on a data-poor area, following international standards. As such, the Centre will directly address the following SOOS's science themes: i)The future and consequences of Southern Ocean carbon uptake and ii) The impacts of global change on Southern Ocean ecosystems.

The IDEAL Centre will collaborate, besides SOOS, with other global initiatives in Antarctica, namely SOCCOM, AnT-ERA (SCAR) and SC-CCAMLR.

Project Timeline
2016 – 2020

Key deliverables
The IDEAL Centre will contribute with new data on physical and biological oceanography in the Bransfield Strait area. The studies will identify major forces driving productivity in this area and will aid to a regional-model of the oceanography and biogeochemistry for the northern Maritime Antarctica.

Results will be used for informing on climate change impacts (sea temperature, salinity, CO2) on antarctic and subantartic ecosystems, particularly on wild populations, fisheries and aquaculture.

Funding
Yes.

Linkages with other programmes
The IDEAL Centre have partnership with the Alfred-Wegener Institute – Helmholtz Center - for Polar and Marine Research (AWI-Germany), Scripps-USA, the Center for Coastal Physical Oceanography (CCPO-USA), and the Korean Polar Research Institute (KOPRI-Korea).

Modelling effort will be primary undertake on a join effort by IDEAL-CCPO-SOCCOM.

[SOCCOM: Southern Ocean Carbon and Climate Observations and Modelling]

Data Management
The Centre will deposit data on CENDHOC (Chile) and PANGEA.